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(54) **Base paper web feeder.**

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IBM Technical Disclosure Bulletin Vol. 28 No. 4 Page 1584-85 September 1985 "Apparatus for adhesive preparation and transfer to a reel of a tape cartridge."

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Description

The present invention relates to a rolled base paper web feeder as defined by the features of the preamble of claim 1 and adapted to be equipped in a corrugating machine, a rotary press or the like.

Description of the Prior Art

At first, description will be made on a rolled base paper web feeder in the prior art with reference to drawings, in which Fig. 3 is a schematic view illustrating a method for exchanging base paper webs according to an order change, and Fig. 4 is a schematic view to be referred to for illustrating disadvantages of the base paper web feeder in the prior art.

In Fig. 3, base paper webs (a liner, a core paper web) 1a and 1b for manufacturing corrugated cardboard sheets are formed in a roll shape, and under an initial setting condition, they are carried in and installed at predetermined positions within a manufacturing line with the opposite ends of their central portions supported by rolling centers 3 of base paper web feeders Pa and Pb. Then, these base paper webs 1a and 1b to be used for the manufacture are successively payed out by pinching rotation of feed rolls 16a and 16b to be conveyed to the next step of the process, and in order to prevent occurrence of creases and slackening by braking excessive feed and applying a back tension, at the rolling center portions 3 of the base paper web feeders Pa and Pb are provided brakes not shown in the figure.

Now, upon exchange of base paper webs according to an order change, as shown in Fig. 3, a leading end of a new-order base paper web 1b held in a standby state is joined to a traveling old-order base paper web 1a via a double-sided adhesive tape 17, and also the old-order base paper web 1a is cut at the position Z shown in the figure by means of a cutter 18 disposed contiguously to this joining point so that the next new-order base paper web 1b can be fed continuously.

It is to be noted that at the leading end of the old-order base paper web 1a cut at the time of joining paper web, a base paper web portion X-Y-Z as shown in the figure, that is, a leading end portion of the paper web corresponding to the length from a position X where the rolled base paper web 1a is payed out up to a cutting position Z would be left under a pulled-out condition.

Accordingly, as a treatment for the remaining old-order base paper web 1a, a work of winding up the above-mentioned payed-out portion of the rolled base paper web around the side of the original roll followed by sticking it onto the roll by means of anti-slackening tapes 19 as shown in Fig. 6 and 7 would become necessary. And in the prior art, for the work of rewinding and accommodating the payed-out leading end portion of the rolled base paper web, a method of manually rotating the roll or rotating the roll with the aid of rotary drive means associated with the rear end of the rolling center 3 was employed.

However, the above-mentioned paper web end rewinding apparatus in the prior art did not have an automatic setting function for the paper web end position, and so, depending upon a stop position of the paper web end after it was wound around the roll, there was a disadvantage that the paper web end may loosen and sag as illustrated in Fig. 3, or it may stop at a location where a workability is bad, resulting in inconvenience for the sticking work of the anti-slackening tapes 19. Therefore, in view of these circumstances, upon positioning of the leading end of the paper web, delicate handworks (rewinding around the roll) or fine movements in the case of a motor-drive type of apparatus were necessitated. Accordingly, a long time was necessitated as a working time period and the work was difficult, and hence a working efficiency could not be improved, and this became a large problem jointly with frequent order changes.

As described in the preceding paragraph of the prior art, in the base paper web feeder in the prior art, upon exchange of base paper webs, when a base paper web portion remaining in a pulled-out state at the leading end of the base paper web, after the old-order base paper web was cut, is rewound around the original roll to be accommodated, a method of rewinding the pulled-out base paper web portion either manually or by means of a rotary driving device provided at the rolling center portion was employed.

However, in the above-mentioned method relying upon human labor, depending upon a weight of a base paper web, the work is difficult. Also in the method relying upon rotary drive means, the position of a cut end of a base paper web on the circumference of the roll is indefinite, and hence for moving the roll up to a working position for setting, correction by manual operation or correction by fine movement of a rotary driving device is necessitated, in addition the work is not automated such that a method of applying the adhesive tapes for fixing a leading end of a rolled base paper web (for anti-slackening) also through a manual work is employed, and so, there still remains a disadvantage such that it takes time for exchanging a base paper web and resetting the machine.

A prior art base paper web feeder is described in JP-A-57-121549. This known feeder has a shaft supporting a roll of a base paper web, a revolution number detector equipped on the shaft to obtain its revolution number, a speed detector in touch with

the base paper web and a controller for determining a remained length of base paper web on the roll based on this information for inventory purposes.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide an improved base paper web feeder, in which the above mentioned problems involved in the base paper web feeder in the prior art can be resolved.

A more specific aspect of the present invention is to provide a base paper web feeder, in which upon exchange of base paper webs, feeding of an old-order base paper web is stopped with a leading end cut portion of the old-order base paper web placed at a predetermined position on the circumference of the original old-order rolled base paper web, and adhesive tapes for fixing can be sticked automatically.

According to the present invention there is provided a base paper web feeder, comprising a rolling center for supporting a roll of a base paper web, a revolution number detecting means for detecting a revolution number of the rolling center, a traveling velocity detecting means for detecting a traveling velocity of the base paper web, and a controller to which the revolution number detecting means and the traveling velocity detecting means are connected, characterized in that a rotary driving device is provided for the rolling center, said controller is adapted to calculate data corresponding to an amount of revolution of said rolling center on the basis of a relation between a length between a predetermined position of the leading end of the base paper web on the circumference of the roll and a cut position of the base paper web and a diameter of the base paper web roll determined from the revolution number of the rolling center and the traveling velocity, wherein said calculated data is fed back from the controller to the rotary driving device so as to rewind a payed out length of the base paper web onto the roll.

According to the present invention, a diameter D of an old-order base paper web is calculated on the basis of a traveling velocity v of the base paper web at the time of joining paper webs and a number of revolution per unit time N of the rolling center of the old-order base paper web according to a formula $D = v/(\pi \cdot N)$. Then, on the basis of a relation between a payed-out length L of the base paper web upon cutting the old-order base paper web (that is, a length between a stop position of a leading end of the base paper web on the circumference of the roll and a cut position) and the diameter D of the above-mentioned old-order base paper web of $L = \pi \cdot D \cdot N_0$, there is calculated a number of revolution N_0 of the rolling center of the old-order base paper web for producing the payed-out length L of the above-mentioned base paper web according to a formula $N_0 = L/(\pi \cdot D)$. The above-mentioned number of revolution N_0 is fed back to a rotary driving device of the rolling center (rolled old-order base paper web), the roll of the base paper web is inversely rotated by this number of revolution N_0, and thereby the leading end portion of the old-order base paper web cut for the purpose of exchange of base paper webs is rewound on the roll. According to the present invention, owing to the above-mentioned control, it becomes possible that, after the cut portion of the leading end of the old-order base paper web has been set (stopped) at a predetermined position on the circumference of the rolled base paper web, adhesion tapes for anti-slackening are automatically stuck, and therefore, exchange of base paper webs necessitates only the works of unloading an old-order base paper web and loading a new-order base paper web.

The above-mentioned and other objects, features and advantages of the present invention will become more apparent by reference to the following description of one preferred embodiment of the invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Fig. 1 is a general plan view of construction of a base paper web feeder according to the present invention;

Fig. 2 is a side view of the arrangement shown in Fig. 1;

Fig. 3 is a schematic view for explaining a method of exchanging base paper webs according to an order change;

Fig. 4 is a schematic view for illustrating disadvantages of a base paper web feeder in the prior art;

Fig. 5 is a schematic view to be referred to for explaining the operation of the base paper web feeder according to the present invention;

Fig. 6 is a side view for explaining a method for accommodating an old-order base paper web after exchange; and

Fig. 7 is a front view for explaining a method for accommodating an old-order base paper web after exchange.

BEST MODE FOR CARRYING OUT THE INVENTION

In the following explanation of the present invention with respect to an embodiment with refer-

ence to the drawings, Fig. 1 is a general view of construction for explaining a base paper web feeder according to the present invention. In the present invention, upon exchange of base paper webs accompanied by an order change and the like, such control is provided that a remaining leading end portion rewound (payed-out) from an old-order base paper web is wound on the side of the original roll, and a leading end cut portion is allowed to stop at a predetermined position on the circumference of the roll, so as to automate following treatments such as prevention of slackening and the like, that is application of tapes for fixing, the construction and function of which will be explained hereinafter.

As shown as one example in Fig. 1, according to the present invention there are provided brakes 4 at rear ends of a pair of rolling centers 3a and 3b supported by movable stands 2 with a shaft at the base paper web feeder portion in order to support a known rolled paper web 1. The brake 4 is constituted by a rotational element 4b secured to the shaft of the rolling centers 3a and 3b via a key 5 and a rotational element 4a, in which a gear 6 secured to one end side of the rotational element 4a is engaged with a gear 8 secured to an axial end of a motor 7 mounted to the same stand 2. In addition, to an axial rear end of the rolling center 3a at one side is mounted an encoder 10 via a coupling 9.

On the other hand, to one side end of a shaft of a feed roll 16a supported by a frame 11 with a shaft for conveying a base paper web 1 is mounted an encoder 14 via a coupling 13 in the same manner as the rolling center 3a. Incidentally, in the figure, 15 is a controller in which after input of data transmitted from the encoders 10 and 14 for calculation, the feed back to the motor 7 is performed, and thereby a number of revolution (angle) of the rolling center 3 (rolled paper web 1) can be set.

In Fig. 2, the traveling velocity v of the rolled paper web 1 is $v = \pi \cdot d \cdot n$ from the diameter d of the feed roll 16a and the number of revolution per unit time n, and this value is equal to $v = \pi \cdot D \cdot n$ obtained from the diameter D of the rolled base paper web 1 and the number of revolution per unit time N. Therefore, on the basis of a relation of $v = \pi \cdot d \cdot n = \pi \cdot D \cdot N$, the diameter D of the rolled paper web 1 upon joining the paper web can be calculated with $D = \pi \cdot d \cdot n / \pi \cdot N$ (d is a constant value, and n and N can be detected by the encoders 10 and 14).

On the other hand, the rolled paper web length L payed-out at the leading end of the rolled paper web upon joining the paper web, that is a length between the standard point X on the circumference of the rolled paper web, the point Y for turning around the guide roll 12 and the cutting point Z of the base paper web in Fig. 2 is approximately a constant value. Therefore, with respect to the relation of the diameter D of the rolled paper web 1 after cutting the old-order base paper web and the above-mentioned payed-out length L, the number of revolution N_0 of the rolling center of the base paper web necessary for the same length L to be payed-out can be calculated with $L = \pi D N_0$ that is $N_0 = L/\pi D$, and when the rolling center of the base paper web is inversely rotated by the number of revolution of N_0 (angle) to allow the leading end of the paper web to be wound, the cutting point at the leading end of the rolled paper web can be coincided with the standard point X on the circumference of the rolled paper web.

Incidentally, the working place shown in Fig. 5 (the position Y for sticking the anti-slackening tapes) can be optionally set by correction with respect to the standard point X, and also excessive rotation or the like of the rolled paper web accompanied by the inertia after cutting can be easily corrected by counting the number of revolution with the encoder 10 to be inversely rotated.

The present invention is constructed to provide the function as described above, wherein the position Z of the cutting point (the utmost leading end portion) of the old-order base paper web cut for the purpose of exchange of base paper webs is subjected to winding to the side of the original roll to make it possible to be positioned at the specified place on the circumference.

In addition, 20 in Fig. 2 is a tape sticking device constructed as a pair to be capable of contact and separation with respect to the outer peripheral surface of the rolled paper web or as plural sets provided to align in an axial direction of the roll of the rolled paper web, with which after the rolled paper web is wound to the side of the roll to allow the leading end to stop at a predetermined position, for example, at X, the anti-slackening tapes 19 can be automatically stuck at the specified positions shown in Fig. 7 (three positions in the figure). Incidentally, as the above mentioned automatic tape sticking device there are various known types.

As explained above, according to the present embodiment, the treatment of the leading end of the old-order base paper web is automated, so that the exchange of base paper webs necessitates replacement of new-order and old-order base paper webs only.

Claims

1. A base paper web feeder, comprising

a rolling center (3) for supporting a roll of a base paper web,

a revolution number detecting means (10)

for detecting a revolution number of the rolling center (3),

a traveling velocity detecting means (14) for detecting a traveling velocity (v) of the base paper web, and

a controller (15) to which the revolution number detecting means (10) and the traveling velocity detecting means (14) are connected, characterized in that

a rotary driving device (7) is provided for the rolling center (3),

said controller (15) is adapted to calculate data corresponding to an amount of revolution (N_o) of said rolling center (3) on the basis of a relation between a length (L) between a predetermined position of the leading end of the base paper web on the circumference of the roll and a cut position of the base paper web and a diameter (D) of the base paper web roll determined from the revolution number of the rolling center (3) and the traveling velocity (v), wherein said calculated data is fed back from the controller (15) to the rotary driving device (7) so as to rewind a payed out length of the base paper web onto the roll.

2. The base paper web feeder as claimed in claim 1, characterized in that said traveling velocity detecting means (14) for detecting a traveling velocity (v) of the base paper web is connected with feed roll (16a) for conveying the base paper web.

Patentansprüche

1. Roh- oder Grundpapierbahnförderer, umfassend:

ein Rollager (3) zum Tragen bzw. Lagern einer Rolle einer Grundpapierbahn,

eine Umdrehungszahldetektiereinheit (10) zum Detektieren einer Umdrehungszahl des Rollagers (3),

eine Laufgeschwindigkeitsdetektiereinheit (14) zum Detektieren einer Laufgeschwindigkeit (v) der Grundpapierbahn und

eine Steuereinheit (15) an welche die Umdrehungszahldetektiereinheit (10) und die Laufgeschwindigkeitsdetektiereinheit (14) angeschlossen sind,

dadurch gekennzeichnet, daß

eine Drehantriebsvorrichtung (7) für das Rollager (3) vorgesehen ist, (und)

die Steuereinheit (15) Daten entsprechend einer Größe der Umdrehung (N_O) des Rollagers (3) auf der Grundlage einer Beziehung zwischen einer Länge (L) zwischen einer vorbestimmten Position des Vorderendes der Grundpapierbahn am Umfang der Rolle und einer Schnittstelle der Grundpapierbahn sowie eines Durchmessers (D) der Grundpapierbahnrolle, anhand der Umdrehungszahl des Rollagers (3) und der Laufgeschwindigkeit (v) bestimmt, zu berechnen vermag, wobei die berechneten Daten von der Steuereinheit (15) zur Drehantriebsvorrichtung (7) rückgekoppelt bzw. zurückgespeist werden, um eine abgespulte Länge der Grundpapierbahn auf die Rolle zurückzuwickeln.

2. Roh- bzw. Grundpapierbahnförderer nach Anspruch 1, dadurch gekennzeichnet, daß die Laufgeschwindigkeitsdetektiereinheit (14) zum Detektieren einer Laufgeschwindigkeit (v) der Grundpapierbahn mit einer Förderwalze (16a) zum Transportieren der Grundpapierbahn verbunden ist.

Revendications

1. Un dispositif d'alimentation de bandes de papier de base, comportant

un centre de rotation (3) pour supporter une bobine d'une bande de papier de base,

des moyens (10) de détection de nombre de tours pour détecter un nombre de tours du centre de rotation (3),

des moyens (14) de détection de vitesse de déplacement pour détecter une vitesse de déplacement (v) de la bande de papier de base, et

un dispositif de commande (15) auquel les moyens (10) de détection du nombre de tours et les moyens (14) de détection de vitesse de déplacement sont reliés,

caractérisé en ce que

un dispositif (7) d'entraînement en rotation est prévu pour le centre de rotation (3),

ledit dispositif de commande (15) est agencé pour calculer des données correspondant à une quantité de rotation (N_O) dudit centre de rotation (3) sur la base d'une relation entre une longueur (L) entre une position prédéterminée de l'extrémité avant de la bande de papier de base sur la circonférence de la bobine et une position de coupe de la bande de papier de base et un diamètre D de la bobine de bande de papier de base déterminé à partir du nombre de tours du centre de rotation (3) et de la vitesse de déplacement (v), lesdites données calculées étant renvoyées au dispositif (7) d'entraînement en rotation à partir du dispositif de commande (15) de manière à renvider sur la bobine une longueur dévidée de la bande de papier de base.

2. Le dispositif d'alimentation de bandé de papier de base tel que revendiqué dans la revendication 1,

caractérisé en ce que lesdits moyens (14) de détection de vitesse de déplacement pour détecter une vitesse de déplacement (v) de la bande de papier de base sont reliés à un rouleau d'alimentation (16a) pour transférer la bande de papier de base.

Fig. 1

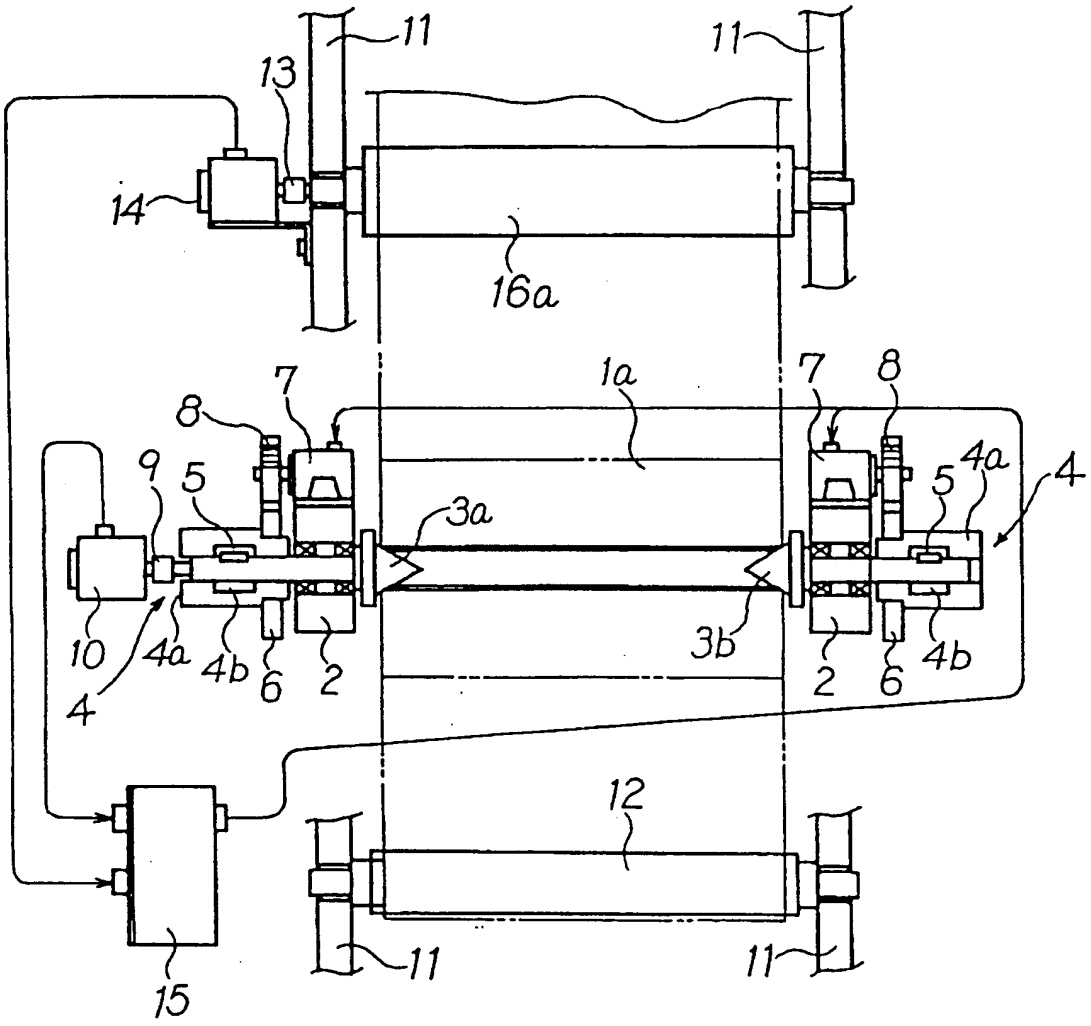
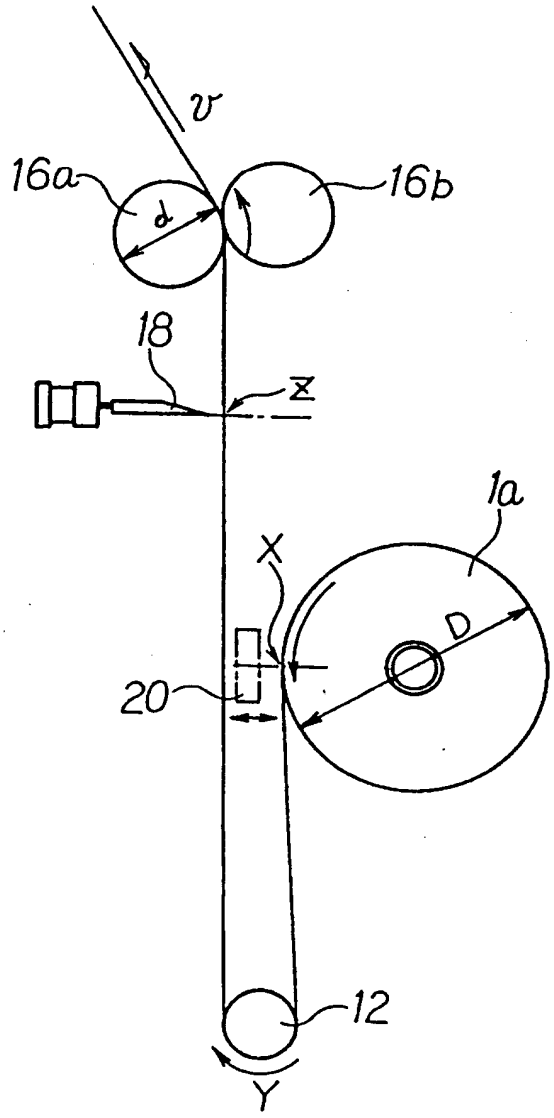


Fig. 2



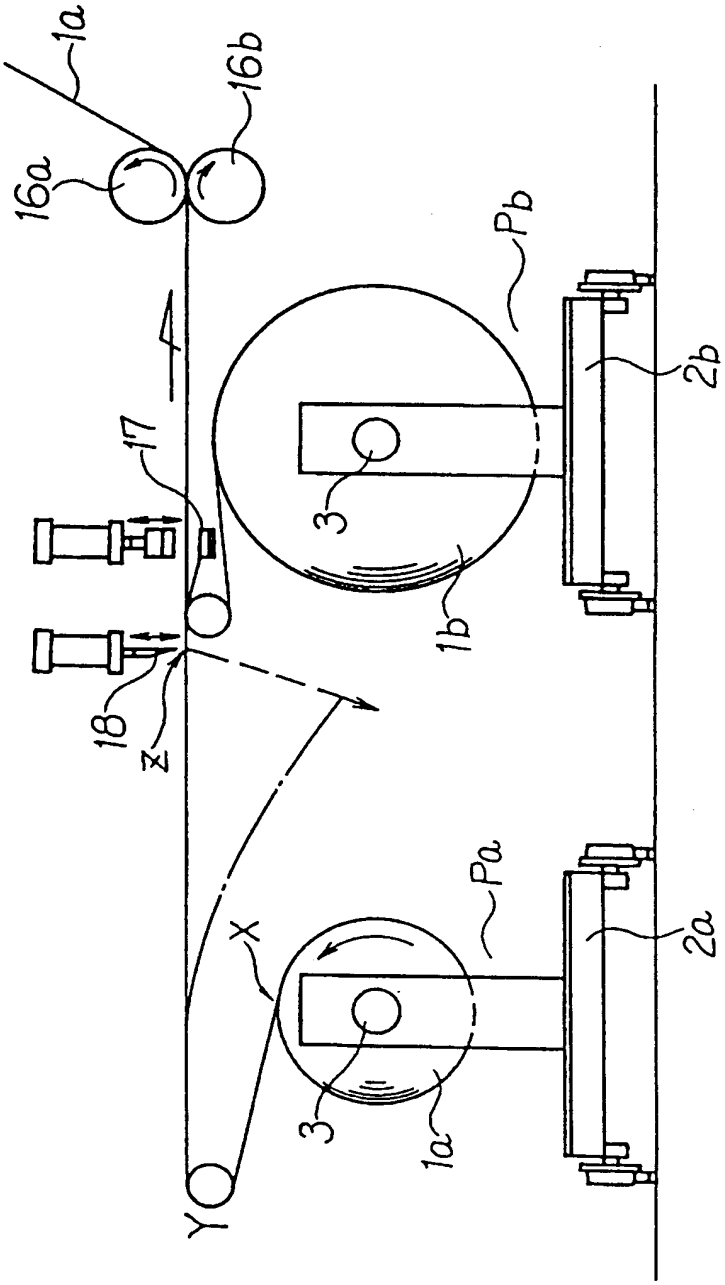


Fig. 3 (Prior Art)

Fig. 4 (Prior Art)

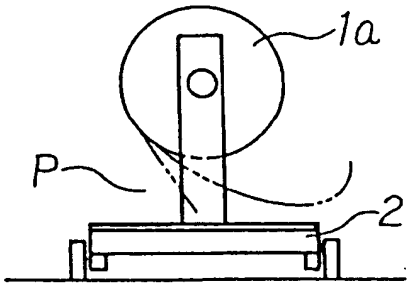


Fig. 5

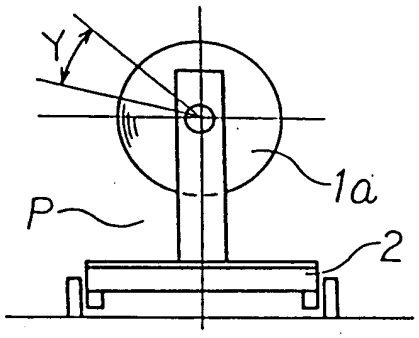


Fig. 6

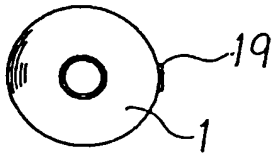


Fig. 7